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Improved Thermal Treatment of Aluminum Alloy 7075

Aluminum alloy 7075 that has been heat-treated to the T6 temper by a previous method has a 0.2 percent offset yield strength of at least 73,000 psi. At this temper, however, the alloy is susceptible to catastrophic failure when exposed to corrosive environments. Although other available tempering treatments increase the alloy's resistance to this type of failure, these treatments also result in lower yield strength. For example, at the T73 temper, the alloy is considered to be immune to catastrophic failure in corrosive environments, but its 0.2 percent offset yield strength is only 63,000 psi.

A newly developed tempering treatment considerably increases the corrosion resistance of the 7075-T6 alloy and concomitantly preserves its yield strength. The new treatment consists of the following sequential steps:

- (1) The 7075-T6 alloy is heated for 1 hour at 900°F and then immediately quenched in oil at 240°F.
- (2) The alloy is aged at 250°F for 24 hours and then air-cooled to room temperature.
- (3) The alloy is overaged at 325°F, for a period of up to 18 hours.

The results of tests on samples of the alloy subjected to the above treatments show that when the overaging period is 12 hours (at 325°F), the alloy exhibits a yield strength of 73,000 psi and a time to failure of more than 1000 minutes in a controlled corrosive environment.

Note:

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Patent status:

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